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WHAT IS CLAIMED:

1. A method for operating an alternator of a motor vehicle, comprising:

- 5 monitoring an amount of stored electrical energy available to operate the vehicle;  
estimating a vehicle electrical load; and  
regulating an output of the alternator based at  
least in part on the amount of electrical energy  
10 available to the vehicle and the estimated electrical load of the vehicle.

2. The method according to claim 1, further comprising the steps of:

- 15 monitoring operation of vehicle electrical components; and  
estimating the vehicle electrical load based on the operation of the vehicle components.

3. The method according to claim 1, further comprising the steps of:

- deriving a schedule of operation of vehicle electrical components; and  
estimating the vehicle electrical load based on the  
25 scheduled operation of the vehicle components.

3  
4. The method according to claim 1, wherein said monitoring step comprises the step of monitoring a battery state of charge.

- 30 4 3  
5. The method according to claim 4, wherein said regulating step comprises selecting an alternator setpoint voltage based on at least in part on the battery state of charge and the estimated vehicle electrical  
35 load.

5 4  
6. The method according to claim 5, wherein said step of selecting an alternator voltage comprises:

deriving a plurality of voltage regulation classifications; and

selecting one of a plurality of voltage regulation strategies corresponding to the voltage regulation classifications.

6  
7. The method according to claim 5, further comprising the step of providing a battery temperature, and further wherein each of the voltage regulation strategies are a function of battery temperature.

7  
8. The method according to claim 5, further comprising the steps of:  
monitoring operation of critical vehicle loads; and  
selecting one of said voltage regulation strategies based at least in part on the operation of the critical vehicle loads.

8  
9. The method according to claim 5, further comprising the step of selecting a setpoint transition strategy to transition operation between the voltage regulation strategies.

10. A method for operating an alternator of a motor vehicle having a battery coupled to the alternator for storing electrical energy, comprising:

monitoring a battery state of charge;  
monitoring operation of vehicle electrical components;  
estimating a vehicle electrical load based on the operation of the vehicle components; and  
regulating an output of the alternator based at least in part on the battery state of charge and the estimated vehicle electrical load.

11. The method according to claim 10, wherein said regulating step comprises selecting an alternator setpoint voltage based at least in part on the battery

state of charge and the estimated vehicle electrical load.

12. The method according to claim 11, wherein said  
5 step of selecting an alternator voltage comprises:  
deriving a plurality of voltage regulation  
classifications; and  
selecting one of a plurality of voltage regulation  
strategies corresponding to the voltage regulation  
10 classifications.

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13. The method according to claim <sup>10</sup>~~12~~<sup>9</sup>, further  
comprising the step of providing a battery temperature,  
and further wherein each of the voltage regulation  
15 strategies are a function of battery temperature.

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14. The method according to claim <sup>10</sup>~~12~~<sup>9</sup>, further  
comprising the steps of:  
monitoring operation of critical vehicle loads; and  
20 selecting one of said voltage regulation strategies  
based at least in part on the operation of the critical  
vehicle loads.

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15. The method according to claim <sup>10</sup>~~12~~<sup>9</sup>, further  
comprising the step of selecting a setpoint transition  
25 strategy to transition operation between the voltage  
regulation strategies.

SUB B3 ✓  
16. A system for operating an alternator of a motor  
30 vehicle, comprising:

a first monitor for indicating an amount of stored  
electrical energy available to operate the vehicle;

a second monitor for indicating operation of vehicle  
electrical components; and

35 a controller coupled to the first and second  
monitors for estimating a vehicle electrical load based  
on operation of vehicle electrical components and for  
regulating an output of the of the alternator based at  
least in part on the indicated amount of stored

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electrical energy and the estimated vehicle electrical load.

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17. The system according to claim 16, wherein said  
5 first monitor comprises a battery state of charge monitor.

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18. The system according to claim 16, wherein said  
10 second monitor comprises means coupled to the vehicle electrical components for communicating information indicative of vehicle electrical load.

16  
19. The system according to claim 16, wherein said  
15 controller comprises:  
means for monitoring operation of the vehicle electrical components; and  
means for estimating the vehicle electrical load based on the operation of the vehicle components.

20  
20. The system according to claim 16, wherein said controller comprises:  
means for deriving a schedule of operation of the vehicle electrical components; and  
means for estimating the vehicle electrical load  
25 based on the scheduled operation of the vehicle components.

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21. The system according to claim 16, wherein said controller comprises means for selecting an alternator setpoint voltage based on the battery state of charge and the estimated vehicle electrical load.

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22. The system according to claim 21, wherein said  
35 controller comprises:  
means for deriving a plurality of voltage regulation classifications; and  
means for selecting one of a plurality of voltage regulation strategies corresponding to the voltage regulation classifications.

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23. The system according to claim 22, further  
comprising a sensor for providing a battery temperature  
and further wherein each of the voltage regulation  
5 strategies are a function of battery temperature.

24. An article of manufacture for operating an  
alternator of a motor vehicle having a battery coupled to  
the alternator for storing electrical energy, said  
10 article of manufacturing comprising:  
a computer usable medium, and  
a computer readable program code embodied in the  
computer usable medium for directing a computer to  
control the steps of monitoring a battery state of  
15 charge, monitoring operation of vehicle electrical  
components, estimating a vehicle electrical load based on  
the operation of the vehicle components, and regulating  
an output of the alternator based at least in part on the  
battery state of charge and the estimated vehicle  
20 electrical load.

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